



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,399	08/27/2003	Keiichi Sato	HIRA.0122	5338
38327	7590	06/20/2006	EXAMINER	
REED SMITH LLP 3110 FAIRVIEW PARK DRIVE, SUITE 1400 FALLS CHURCH, VA 22042			ALANKO, ANITA KAREN	
			ART UNIT	PAPER NUMBER

1765

DATE MAILED: 06/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/648,399

**Applicant(s)**

SATO ET AL.

**Examiner**

**Anita K. Alanko**

## Art Unit

1765

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 5/31/06 amdt.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 2 and 3 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2 and 3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/9/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***Specification***

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification lacks explicit basis for the phrase “the materials for surface modification is converted by the dissolution” newly added to claim 3.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The phrase “the materials for surface modification is converted by the dissolution” lacks explicit basis in the specification.

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term “the materials” lacks proper antecedent basis. Are they oil-soluble materials or the water-soluble materials? What does “converted” mean? Are the materials both peeled and converted?

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Gerion et al (*J. Phys. Chem. B* 2001).

Gerion discloses a method comprising the steps of:

modifying semiconductor nanoparticles (with a diameter of between 3 and 14 nm, Fig.5) with oil-soluble materials (coating by TOPO/TOP, starting materials shown in Fig.1; page 8863, “Experimental Section” part “B”) for surface modification (since the coating is on the surface of the nanoparticles);

converting the oil-soluble materials for surface modification into water-soluble materials for surface modification at the interface between an organic solvent and water (last step shown in Fig.1 the functional groups of thiol and phosphate “to tailor the nanocrystal surface functionality”, or MPA-coated nanocrystals, see page 8862, 2<sup>nd</sup> column, section labeled “Mercaptopropionic Acid-Coated Nanocrystals” ); and

shifting the semiconductor nanoparticles from an organic phase to an aqueous phase by the conversion (since they are soluble in water, p.8868, col.2, lines 15-18).

Gerion discloses to “photobrighten” the nanoparticles by irradiation of aerated solutions (page 8869, col.1, lines 41-42, 48-49), which encompasses the cited size-selective photoetching,

thereby regulating particles sizes (since the solution is brightened, some particles are dissolved and the relative monodisperse particles remain in solution) and monodispersing the semiconductor nanoparticles (since the solution is brightened). Since the same critical steps are performed in Gerion as in the instant method, the same results of dissolution of the surface of the semiconductor nanoparticles, peeling, monodispersity and conversion are inherent.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerion et al (*J. Phys. Chem. B* 2001) in view of Torimoto et al (*J Phys Chem B* 2001).

The discussion of Gerion from above is repeated here.

As to claims 2-3, Gerion does not recognize that irradiating the aerated solution causes size-selective etching. Torimoto teaches that size-selective photoetching is a useful technique for forming ultrasmall semiconductor nanoparticles (see for example, "Introduction" and "Conclusion" sections on pages 6838-6839, 6844). It would have been obvious to one with ordinary skill in the art to use size selective photoetching, thereby regulating particle sizes, monodispersing them, peeling and converting the materials for surface modification, in the method of Gerion because Torimoto teaches that it is a useful technique for forming small semiconductor nanoparticles.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 2-3 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,911,082 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because transporting "between" an aqueous layer and an organic layer encompasses shifting to an aqueous phase.

***Response to Amendment***

Claim 1 has been cancelled, so the rejections over Adams et al (US 6,649,138 B2) and Willner et al (US 2004/0048272 A1) are withdrawn.

Claims 2-3 remain rejected under 35 U.S.C. 102(b) as being anticipated by Gerion et al (*J. Phys. Chem. B* 2001), and rejected under 35 U.S.C. 103(a) as being unpatentable over Gerion et al (*J. Phys. Chem. B* 2001) in view of Torimoto et al (*J Phys Chem B* 2001).

The claims also remain rejected under double patenting over US 6,911,082 B2.

***Response to Arguments***

Applicant's arguments filed 5/31/06 have been fully considered but they are not persuasive to the extent they still apply.

Applicant argues that size-selective photoetching attains a monodispersed distribution of particle sizes, however this limitation is not in claim 3.

Applicant argues that Gerion says nothing about the irradiation by CW-laser to dissolve surface materials of nanoparticles. In response, the dissolution is inherent since the same method steps are conducted as in the instant invention. In the method of Gerion, water-soluble nanoparticles have a surface containing thiols, phosphonate groups, methyl groups and silanol groups (page 8869, col.1, lines 6-9). Applicant's specification also discusses thiols and phosphonate groups. Therefore, the surfaces are similar and when shone with light, are expected to peel because since the same steps are conducted, as broadly cited, as in the invention, the same results are expected. Does applicant use a special type of light to obtain photoetching? Is there something special about how the light is shone so that the photoetching effects peeling?



Applicant argues that a CW laser in Gerion is used to increase the fluorescence intensity and compensate for lower emission intensity of the nanocrystals. In response, this is not in conflict with the claim language. Applicant's method may also have the same properties of fluorescence. The statement that the fluorescence changes and stabilizes suggests that the particles are changing size and becoming monodispersed.

It may be possible that the method of Gerion breaks apart the particles to form a monodisperse solution, without any peeling of a surface layer. Applicant is invited to present evidence showing that Gerion does not have peeling.

Applicant argues that Torimoto does not suggest size-selective photoetching after the surfaces are modified into water-soluble materials. In response, the primary reference already teaches the order. Torimoto is not relied upon to teach the order, but rather is used as a general teaching that "size-selective photoetching can be principally applied to the preparation of any semiconductor nanoparticles."

As to the double patenting rejection, applicant argues that Sato '082 obtains multiple layers, and surface-modifying material is not for photoetching. In response, Sato '082 nonetheless has surface-modifying materials, and then a step of photocorrosion, which is the same as applicant's invention, as broadly cited. The instant invention is not limited to forming only one layer. Claim 1 of Sato '082 cites transporting to an aqueous layer and claim 2 cites size-selective photocorrosion, which are the same steps as in the instant invention. Claim 4 cites thiol compounds and claim 5 cites TOPO/TOP, which are the same materials (although not claimed) as in the instant invention.



Examiner acknowledges the IDS filed on 5/9/06 and the European search report dated March 9, 2006. Examiner agrees that WO 00/17656 A and Torimoto could also be used to reject the claims, in the same manner as Gerion and Torimoto are applied in this office action.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

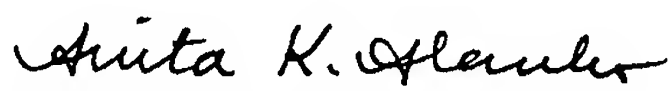
Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anita K. Alanko whose telephone number is 571-272-1458. The examiner can normally be reached on Mon-Fri until 2:30 pm (Wed until 11:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Anita K Alanko  
Primary Examiner  
Art Unit 1765